

## **CLAIMS**

- 1        1.        A method for dynamically patching code, comprising the steps of:
  - 2            intercepting program instructions;
  - 3            determining if a program instruction requires unavailable hardware
  - 4            functionality; and
- 5            dynamically replacing the program instruction with a replacement instruction
- 6            that does not require unavailable hardware functionality if it is determined that the
- 7            program instruction requires unavailable hardware functionality.

1                   2.       The method of claim 1, wherein the step of dynamically replacing the  
2       program instruction comprises fetching a replacement instruction and storing it in a  
3       code cache.

1           3.       The method of claim 2, wherein the step of dynamically replacing the  
2       program instruction further comprises executing the replacement instruction in lieu of  
3       the program instruction each time a function associated with the program instruction  
4       is required.

1                  4.        The method of claim 3, wherein the replacement instruction comprises  
2                  part of a patch that is made available via an application programming interface.

1           5.       The method of claim 1, further comprising the step of, prior to  
2       determining if a program instruction requires unavailable hardware functionality,  
3       determining if the program instruction has been cached.

1           6.     The method of claim 5, further comprising the step of executing the  
2     cached instruction in lieu of the program instruction if an associated instruction has  
3     been cached.

1           7.     The method of claim 1, further comprising the step of, prior to  
2     intercepting program instructions, gaining control over execution of program  
3     instructions by injecting a dynamic execution layer interface into the program.

1           8.     The method of claim 1, further comprising the step of dynamically  
2     receiving information about unavailable hardware functionality and replacement  
3     instructions that are configured to replace original program instructions that require  
4     the unavailable hardware functionality.

1           9.     A system for dynamically patching code, comprising:  
2           means for gaining control over execution of a program;  
3           means for intercepting program instructions;  
4           means for determining if a program instruction requires unavailable hardware  
5     functionality; and  
6           means for dynamically replacing the program instruction with a replacement  
7     instruction that does not require unavailable hardware functionality if it is determined  
8     that the program instruction requires unavailable hardware functionality.

1           10.    The system of claim 9, wherein the means for dynamically replacing  
2     the program instruction comprise means for fetching a replacement instruction and  
3     storing it in a code cache.

1           11. The system of claim 9, further comprising means for determining if a  
2    program instruction has been cached.

1           12. The system of claim 9, further comprising means for dynamically  
2    receiving information about unavailable hardware functionality and replacement  
3    instructions that are configured to replace original program instructions that require  
4    the unavailable hardware functionality.

1           13. A dynamic patching program stored on a computer-readable medium,  
2    comprising:

3            logic configured to gain control over execution of a program;  
4            logic configured to intercept program instructions;  
5            logic configured to determine if a program instruction requires unavailable  
6    hardware functionality; and  
7            logic configured to dynamically replace the program instruction with a  
8    replacement instruction that does not require unavailable hardware functionality if it  
9    is determined that the program instruction requires unavailable hardware  
10    functionality.

1           14. The system of claim 13, wherein the logic configured to dynamically  
2    replace the program instruction comprises logic configured to fetch a replacement  
3    instruction and store it in a code cache.

1           15. The system of claim 13, further comprising logic configured to  
2    determine if a program instruction has been cached.

1           16. The system of claim 13, further comprising logic configured to  
2 dynamically receive information about unavailable hardware functionality and  
3 replacement instructions that are configured to replace original program instructions  
4 that require the unavailable hardware functionality.

1           17. A method for dynamically patching code, comprising the steps of:  
2           gaining control over the execution of a program;  
3           intercepting program instructions;  
4           determining whether the program instructions have been cached and, if so,  
5           executing the cached instructions;  
6           if the program instructions have not been cached, determining if the program  
7           instructions require unavailable hardware functionality; and  
8           dynamically replacing the program instructions with replacement instructions  
9           that do not require unavailable hardware functionality if it is determined that the  
10          program instructions require unavailable hardware functionality.

1           18. The method of claim 17, wherein the step of dynamically replacing the  
2           program instructions comprises fetching replacement instructions and storing them in  
3           a code cache.

1           19. The method of claim 18, wherein the step of dynamically replacing the  
2           program instructions further comprises executing the replacement instructions in lieu  
3           of the program instructions each time a functionality associated with the program  
4           instructions is required.

1           20. The method of claim 19, wherein the replacement instructions  
2 comprise part of a patch that is made available via an application programming  
3 interface.

1           21. A dynamic execution layer interface (DELI) residing between an  
2 application and computing system hardware, comprising:

3           a transparent mode layer that is configured to gain control over the operation  
4 of the application and to fetch replacement instructions that are to replace existing  
5 application instructions;

6           a system control and configuration layer configured to provide policies for the  
7 replacement of existing application instructions with the replacement instructions;

8           a core configured to dynamically cache and execute the replacement  
9 instructions; and

10           a code cache in which the replacement instructions are cached.

1           22. The DELI of claim 21, wherein the transparent mode layer is further  
2 configured to fetch application instructions from the application and wherein the core  
3 is further configured to cache fetched application instructions in the code cache.